Federal Communications Commission
Washington, D. C. 20554

Approved by OMB
3060-0627
Expires 01/31/98

FOR FCC USE ONLY

FCC 302-AM
APPLICATION FOR AM BROADCAST STATION LICENSE

(Please read instructions before filling out form.

FOR COMMISSION USE ONLY
FILE NO. BMML-20000928ADM

SECTION I - APPLICANT FEE INFORMATION

1. PAYOR NAME (Last, First, Middle Initial)
Sciarrino & Shubert, PLLC

MAILING ADDRESS (Line 1) (Maximum 35 characters)
5425 Tree Line Drive

MAILING ADDRESS (Line 2) (Maximum 35 characters)

CITY	STATE OR COUNTRY (if foreign address)	ZIP CODE
Centreville	VA	20120

TELEPHONE NUMBER (include area code)	CALL LETTERS	OTHER FCC IDENTIFIER (If applicable)
(202) 350-9658	KZDC	65330

2. A. Is a fee submitted with this application? [✓] Yes [ ] No

B. If No, indicate reason for fee exemption (see 47 C.F.R. Section

[ ] Governmental Entity [ ] Noncommercial educational licensee [ ] Other (Please explain):

C. If Yes, provide the following information:

Enter in Column (A) the correct Fee Type Code for the service you are applying for. Fee Type Codes may be found in the "Mass Media Services Fee Filing Guide." Column (B) lists the Fee Multiple applicable for this application. Enter fee amount due in Column (C).

(A) FEE TYPE CODE	(B) FEE MULTIPLE	(C) FEE DUE FOR FEE TYPE CODE IN COLUMN (A)	FOR FCC USE ONLY
MMR	0001	$ 615.00	

To be used only when you are requesting concurrent actions which result in a requirement to list more than one Fee Type Code.

(A)	(B)	(C)	FOR FCC USE ONLY
MOR	0001	$ 705.00	

	TOTAL AMOUNT REMITTED WITH THIS APPLICATION	FOR FCC USE ONLY
ADD ALL AMOUNTS SHOWN IN COLUMN C, AND ENTER THE TOTAL HERE. THIS AMOUNT SHOULD EQUAL YOUR ENCLOSED REMITTANCE.	$ 1,320.00.	

SECTION II - APPLICANT INFORMATION		
1. NAME OF APPLICANT BMP SAN ANTONIO LICENSE COMPANY, L.P.		
MAILING ADDRESS 8750 NORTH CENTRAL EXPRESSWAY, SUITE 645		
CITY DALLAS	STATE TX	ZIP CODE 75231

2. This application is for:

☑ Commercial ☐ Noncommercial

☑ AM Directional ☐ AM Non-Directional

Call letters	Community of License	Construction Permit File No.	Modification of Construction Permit File No(s).	Expiration Date of Last Construction Permit
KZDC	SAN ANTONIO, TX	BP-20071025AAK		04/08/2011

3. Is the station now operating pursuant to automatic program test authority in accordance with 47 C.F.R. Section 73.1620?

☐ Yes ☑ No

If No, explain in an Exhibit.

Exhibit No. 1

4. Have all the terms, conditions, and obligations set forth in the above described construction permit been fully met?

☑ Yes ☐ No

If No, state exceptions in an Exhibit.

Exhibit No.

5. Apart from the changes already reported, has any cause or circumstance arisen since the grant of the underlying construction permit which would result in any statement or representation contained in the construction permit application to be now incorrect?

☐ Yes ☑ No

If Yes, explain in an Exhibit.

Exhibit No.

6. Has the permittee filed its Ownership Report (FCC Form 323) or ownership certification in accordance with 47 C.F.R. Section 73.3615(b)?

☐ Yes ☐ No

☑ Does not apply

If No, explain in an Exhibit.

Exhibit No.

7. Has an adverse finding been made or an adverse final action been taken by any court or administrative body with respect to the applicant or parties to the application in a civil or criminal proceeding, brought under the provisions of any law relating to the following: any felony; mass media related antitrust or unfair competition; fraudulent statements to another governmental unit; or discrimination?

☐ Yes ☑ No

If the answer is Yes, attach as an Exhibit a full disclosure of the persons and matters involved, including an identification of the court or administrative body and the proceeding (by dates and file numbers), and the disposition of the litigation. Where the requisite information has been earlier disclosed in connection with another application or as required by 47 U.S.C. Section 1.65(c), the applicant need only provide: (i) an identification of that previous submission by reference to the file number in the case of an application, the call letters of the station regarding which the application or Section 1.65 information was filed, and the date of filing; and (ii) the disposition of the previously reported matter.

Exhibit No.

8. Does the applicant, or any party to the application, have a petition on file to migrate to the expanded band (1605-1705 kHz) or a permit or license either in the existing band or expanded band that is held in combination (pursuant to the 5 year holding period allowed) with the AM facility proposed to be modified herein?

☐ Yes ☑ No

If Yes, provide particulars as an Exhibit.

Exhibit No.

The APPLICANT hereby waives any claim to the use of any particular frequency or of the electromagnetic spectrum as against the regulatory power of the United States because use of the same, whether by license or otherwise, and requests and authorization in accordance with this application. (See Section 304 of the Communications Act of 1934, as amended).

The APPLICANT acknowledges that all the statements made in this application and attached exhibits are considered material representations and that all the exhibits are a material part hereof and are incorporated herein as set out in full in

CERTIFICATION

1. By checking Yes, the applicant certifies, that, in the case of an individual applicant, he or she is not subject to a denial of federal benefits that includes FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. Section 862, or, in the case of a non-individual applicant (e.g., corporation, partnership or other unincorporated association), no party to the application is subject to a denial of federal benefits that includes FCC benefits pursuant to that section. For the definition of a "party" for these purposes, see 47 C.F.R. Section 1.2002(b).

☑ Yes ☐ No

2. I certify that the statements in this application are true, complete, and correct to the best of my knowledge and belief, and are made in good faith.

Name	Signature	
Joan Leonard		
Title	Date	Telephone Number
Senior Vice President & Controller	9-1-10	(214) 692-2000

WILLFUL FALSE STATEMENTS ON THIS FORM ARE PUNISHABLE BY FINE AND/OR IMPRISONMENT (U.S. CODE, TITLE 18, SECTION 1001), AND/OR REVOCATION OF ANY STATION LICENSE OR CONSTRUCTION

FCC NOTICE TO INDIVIDUALS REQUIRED BY THE PRIVACY ACT AND THE PAPERWORK REDUCTION ACT

The solicitation of personal information requested in this application is authorized by the Communications Act of 1934, as amended. The Commission will use the information provided in this form to determine whether grant of the application is in the public interest. In reaching that determination, or for law enforcement purposes, it may become necessary to refer personal information contained in this form to another government agency. In addition, all information provided in this form will be available for public inspection. If information requested on the form is not provided, the application may be returned without action having been taken upon it or its processing may be delayed while a request is made to provide the missing information. Your response is required to obtain the requested authorization.

Public reporting burden for this collection of information is estimated to average 639 hours and 53 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden, can be sent to the Federal Communications Commission, Records Management Branch, Paperwork Reduction Project (3060-0627), Washington, D. C. 20554. Do NOT send completed forms to this address.

THE FOREGOING NOTICE IS REQUIRED BY THE PRIVACY ACT OF 1974, P.L. 93-579, DECEMBER 31, 1974, 5 U.S.C. 552a(e)(3), AND THE PAPERWORK REDUCTION ACT OF 1980, P.L. 96-511, DECEMBER 11, 1980, 44 U.S.C. 3507.

SECTION III - LICENSE APPLICATION ENGINEERING DATA

Name of Applicant

BMP SAN ANTONIO LICENSE COMPANY, L.P.

PURPOSE OF AUTHORIZATION APPLIED FOR: (check one)

☑ Station License ☐ Direct Measurement of Power

1. Facilities authorized in construction permit

Call Sign	File No. of Construction Permit (if applicable)	Frequency (kHz)	Hours of Operation	Power in kilowatts	
				Night	Day
KZDC	BP-20071025AAK/BMP-20100803AAK	1250	UNLIMITED	N/A	25.0

2. Station location

State	City or Town
Texas	San Antonio

3. Transmitter location

State	County	City or Town	Street address (or other identification)
Texas	Bexar	San Antonio	13699 S. US HWY 281

4. Main studio location

State	County	City or Town	Street address (or other identification)
Texas	Bexar	San Antonio	4050 Eisenhauer Road

5. Remote control point location (specify only if authorized directional antenna)

State	County	City or Town	Street address (or other identification)
Texas	Bexar	San Antonio	4050 Eisenhauer Road

6. Has type-approved stereo generating equipment been installed? ☐ Yes ☑ No

7. Does the sampling system meet the requirements of 47 C.F.R. Section 73.68? ☑ Yes ☐ No ☐ Not Applicable

Attach as an Exhibit a detailed description of the sampling system as installed. Exhibit No. E-1

8. Operating constants:

RF common point or antenna current (in amperes) without modulation for night system	RF common point or antenna current (in amperes) without modulation for day system
N/A	22.9

Measured antenna or common point resistance (in ohms) at operating frequency		Measured antenna or common point reactance (in ohms) at operating frequency	
Night	Day	Night	Day
N/A	50	N/A	-j5.0

Antenna indications for directional operation

Towers	Antenna monitor Phase reading(s) in degrees		Antenna monitor sample current ratio(s)		Antenna base currents	
	Night	Day	Night	Day	Night	Day
1 (NW)	N/A	+24.2	N/A	1.36	N/A	N/A
2 (NE)	N/A	0.0	N/A	1.0	N/A	N/A
3 (SE)	N/A	+94.9	N/A	1.28	N/A	N/A
4 (SW	N/A	+106.1	N/A	0.99	N/A	N/A

Manufacturer and type of antenna monitor: Potomac Instruments 1901-4

9. Description of antenna system ((f directional antenna is used, the information requested below should be given for each element of the array. Use separate sheets if necessary.)

Type Radiator	Overall height in meters of radiator above base insulator, or above base, if grounded.	Overall height in meters above ground (without obstruction lighting)	Overall height in meters above ground (include obstruction lighting)	If antenna is either top loaded or sectionalized, describe fully in an Exhibit.
See E-1	See E-1	See E-1	See E-1	Exhibit No. E-1

Excitation ☑ Series ☐ Shunt

Geographic coordinates to nearest second. For directional antenna give coordinates of center of array. For single vertical radiator give tower location.

North Latitude	West Longitude
29 ° 17 ' 01 "	98 ° 28 ' 28 "

If not fully described above, attach as an Exhibit further details and dimensions including any other antenna mounted on tower and associated isolation circuits. Exhibit No. N/A

Also, if necessary for a complete description, attach as an Exhibit a sketch of the details and dimensions of ground system. Exhibit No. N/A

10. In what respect, if any, does the apparatus constructed differ from that described in the application for construction permit or in the permit?

None except for deletion of top loading on towers 1 & 4 in pending application for construction permit

BMP-20100803AAK; Correction of coordinates in amended BMP-20100803AAK; Note that this application is for the daytime site only.

11. Give reasons for the change in antenna or common point resistance.

New Site

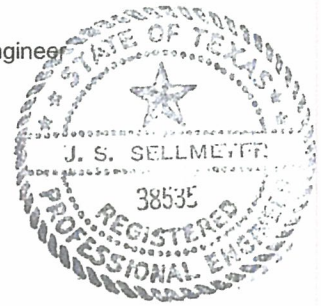
I certify that I represent the applicant in the capacity indicated below and that I have examined the foregoing statement of technical information and that it is true to the best of my knowledge and belief.

Name (Please Print or Type)	Signature (check appropriate box below)
J. S. Sellmeyer, P. E.	J. S. Sellmeyer
Address (include ZIP Code) Sellmeyer Engineering 2 Pecan Grove Circle Lucas, Texas 75002	Date August 31, 2010 Telephone No. (Include Area Code) 972-542-2056

☐ Technical Director ☑ Registered Professional Engineer

☐ Chief Operator ☐ Technical Consultant

☐ Other (specify)



SELLMEYER ENGINEERING
BROADCAST & COMMUNICATIONS CONSULTING ENGINEERS
2 Pecan Grove Circle, Lucas, Texas 75002
jack@sellmeyereng.com
MEMBER AFCCE

EXHIBIT E-1

ENGINEERING STATEMENT AND APPLICATION FOR STATION LICENSE METHOD OF MOMENTS DIRECTIONAL ANTENNA PROOF OF PERFORMANCE BMP SAN ANTONIO LICENSE COMPANY, L.P. RADIO STATION KZDC 1250 KHZ, 25 KW-LS, DA-D SAN ANTONIO, TEXAS (DAYTIME SITE)

FACILITY ID: 65330
C.P. FILE NUMBER: BP-20071025AAP
APPICATION FILE NO.: BMP-20100803
(AS AMENDED)

AUGUST 2010

SELLMEYER ENGINEERING
BROADCAST & COMMUNICATIONS CONSULTING ENGINEERS
2 Pecan Grove Circle, Lucas, Texas 75002
jack@sellmeyereng.com
MEMBER AFCCE

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RADIO STATION KZDC
DAYTIME SITE

SELLMEYER ENGINEERING
BROADCAST & COMMUNICATION CONSULTING ENGINEERS
2 Pecan Grove Circle, Lucas, Texas 75002
MEMBER AFCCE

EXHIBIT E-1

ENGINEERING STATEMENT RE: LICENSE APPLICATION FOR RADIO STATION KZDC 1250 KHZ, 2.0 KW, 25.0 KW-LS, DA-2-UNL SAN ANTONIO, TEXAS FACILITY ID: 65330 C.P. FILE NO. BP-20071025AAK- DAYTIME SITE APPLICATION BMP-20100803AAK AS AMENDED METHOD OF MOMENTS DA PROOF OF PERFORMANCE

INTRODUCTION

This Firm has been retained by BMP San Antonio License Company, L.P. ("BMP") to evaluate the KZDC daytime site construction, make certain corrections and adjust the Daytime Directive Array to comply with the terms of the construction permit.

During the repair phase of the project it was determined that the top loading for towers 1 and 4 was implemented in a different manner on each of the two towers, neither of which provided the required amount of top loading. Following a review of the daytime allocation, it was determined that the specified top loading of the two towers could be eliminated without any significant effect on daytime coverage and with no interference to any other station. An application for modification of the construction permit was prepared and filed under file number BMP-20100803AAK . The application has been amended to correct the coordinates of the center of the array and remains pending at this date.

The facilities authorized in the instant construction permit were constructed in exact accordance with the terms of the permit with the exception of the top loading on towers 1 and 4. No other deviations from the terms of the permit were noted during the directional antenna adjustment. The adjustment of the directional array was completed on August 20, 2010.

The station is ready for operation and Program Test Authority is respectfully requested at the earliest possible date.

SUMMARY

The instant Engineering Statement and associated exhibits support an application for station license on FCC Form 302-AM for new daytime transmission facilities for station KZDC, San Antonio,, Texas. The station has constructed a new

transmitter site employing a four element directive array for daytime operation only. Nighttime operation will be from a different site.

The recently enacted AM technical Rules permitting method of moments modeling of eligible directional arrays has been employed for the directive array adjustments as the KZDC array fully complies with the newly enacted Rules.

Information is provided herein demonstrating that the directional antenna parameters for the daytime pattern authorized by the FCC have been determined in accordance with the requirements of 47 CFR Section 73.151(c). The system has been adjusted to produce antenna monitor parameters within +/-5 percent in ratio and +/-3 degrees in phase of the modeled values as required by the new Rules.

The following exhibits describe in full the steps taken to verify the Method of Moments model and to determine the required operating parameters for the daytime array.

1) Analysis of Tower Impedance Measurements to Verify Method of Moments Model

Base impedance measurements of each element of the array were made at the output test jack of each antenna coupling unit. The Output Test Jack ("J Plug") has only interconnecting tubing between its output and the feedthrough insulator on the rear of the cabinet. The RF feed pipe between the insulator and the tower is a large diameter copper pipe connected directly to the tower connection. The static drain choke in shunt with the output lead was disconnected for the measurements. The Toroidal Current Transformer ("TCT") was left in place in the output line. All other towers had their static drain chokes disconnected and J Plugs open circuited for the base impedance measurements. This arrangement leaves only the stray capacitances in shunt and the output feed tubing in series with the tower bases.

ACSModel (MININEC 3.1 Core) was used to model the KZDC array.

A lumped load with a reactance of –j10,000 ohms was modeled at the base of open circuited towers to simulate an open circuit at each tower base.

The tower heights were adjusted in the model to calibrate the model with the measured base impedances. All modeled tower heights fall within the permitted range of 75 to 125 percent of the physical tower height as required by the Rules.

The modeled radius for each tower was the listed physical radius as determined by the formula 3FW/2pi, where FW is the face width in meters. The KZDC radiators are

uniform cross section towers with a face width of 2 feet (0.6096 meters). Each tower's radius was modeled at 0.2911 meters.

Each tower is fed with a short length of soft drawn copper tubing that exhibits a small amount series inductance. This tubing connects between a feed through bowl insulator on the side of the associated antenna coupling cabinet and the tower base immediately above the base insulator.

The base elevations at each tower are within +/- 0.6 electrical degree of each other at 1250 kilohertz.

The calibration procedure includes the different series feed reactances and provides excellent correlation between the measured Antenna Coupler Output impedances and the modeled impedances within the allowable tolerances specified in the Rules.

A circuit model was constructed for each tower base using the assumed series feed tubing reactances and shunt base region reactances. The model was used with the Westberg Circuit Analysis Program WCAP PRO to determine the effect of the reactances on the ACU output impedances at each tower. This program is a nodal analysis program suitable for the application.

In each of the WCAP tabulations, node 1 represents the modeled ACU output reference point and node 3 represents the tower base. Node 0 represents ground potential. The ACU output impedance can be found in the "TO IMPEDANCE" column of each WCAP tabulation following the phantom 1.0 ohm resistance inserted in the model to provide a calculation point for the input impedance. The complex base impedance of each tower from the moment method model is represented in each case by the complex node 3 to ground. A value of 30 pF was assumed for the base insulator, which appears in the WCAP tabulation from node 3 to ground as 0.00003 uF. The value of the shunt reactance of the static drain choke was obtained from the manufacturer who reported the value to be –j15,000 ohms or 8.48 pF at 1250 kilohertz. The WCAP circuit model tabulation immediately follows the model for each tower.

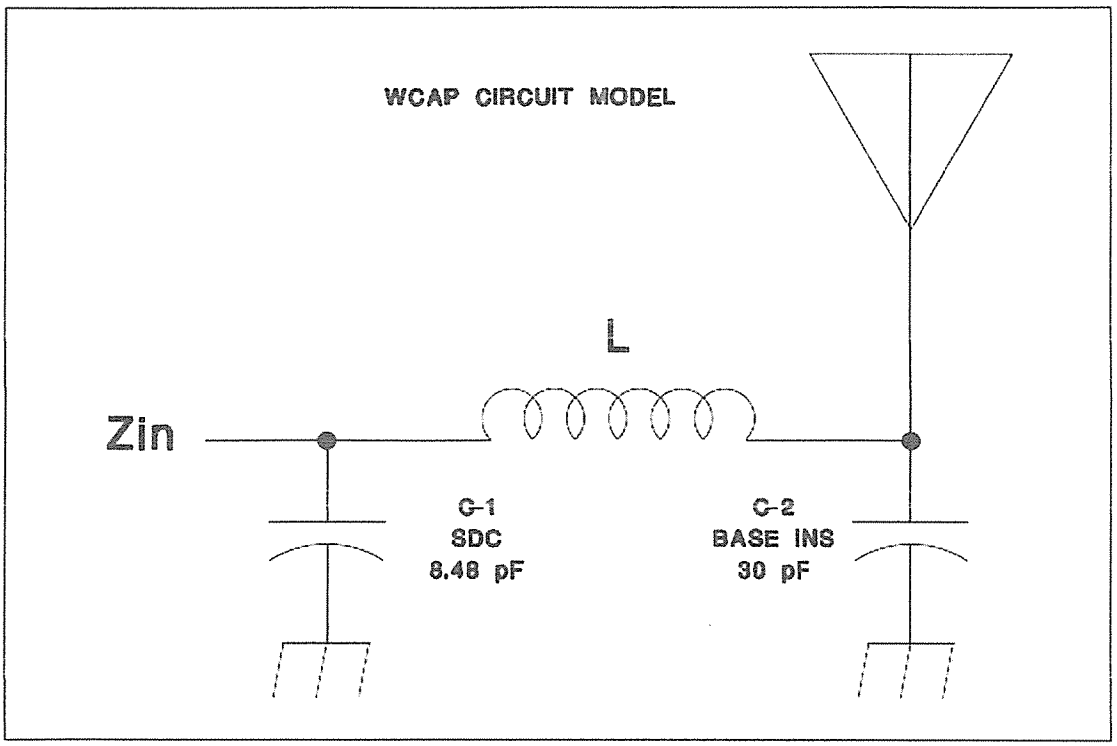
Section 73.151(c)(1)(vii) of the Rules permits the use of lumped series inductance of 10 uH or less between the output port of the antenna coupling unit and the associated tower. In each case, the value of the series inductance is less than 10 uH.

The modeled and measured impedances at the ACU output J-Plugs with the other towers open-circuited at the ACU output J-Plugs agree within +/-2 ohms and +/-4 percent as required by the Rules.

TABLE-1 Analysis of Tower Impedance Measurements to Verify Moment Method Model

TWR	L(uH)	XI	Zbase (modeled)	Zacu (modeled)	Zacu (measured)	Height (degrees)	Percent
1	7.84	+j61.58	32.58-j12.39	32.41 – j48.96	32.59+j49.15	83.22	100.51
2	6.40	+j50.27	44.54+j29.33	45.16+j79.32	44.66+j79.40	91.60	102.69
3	5.57	+j43.75	45.26+j31.47	45.93+j74.96	45.66+j74.86	92.00	103.14
4	5.85	+j45.95	34.48-j5.41	34.39+j40.26	34.50+j40.57	84.60	102.17

All towers were modeled at 100 percent of the face width, or 0.2911 meters.



INDIVIDUAL TOWER & ASSOCIATED WCAP MODELS FOLLOW

****

ACSModel

(MININEC 3.1 Core)

08-14-2010 15:04:11

****

KZDC
DAYTIME ARRAY
T-1E CAL
Frequency = 1.250 MHz Wavelength = 239.84000 Meters

No. of Wires: 4

Wire No. 1 Coordinates X	Y	Z	Radius	End Connection	No. of Segments
0	0	0		-1	
0	0	**55.463**	**0.2911**	0	20

Wire No. 2 Coordinates X	Y	Z	Radius	End Connection	No. of Segments
87.77235	91.20896	0		-2	
87.77235	91.20896	61.02596	0.2911	0	20

Wire No. 3 Coordinates X	Y	Z	Radius	End Connection	No. of Segments
44.78654	131.5596	0		-3	
44.78654	131.5596	61.29245	0.2911	0	20

Wire No. 4 Coordinates X	Y	Z	Radius	End Connection	No. of Segments
-39.20266	41.60085	0		-4	
-40.61907	43.10391	56.3624	0.2911	0	20

**** ANTENNA GEOMETRY ****

Wire No. 1 Coordinates X	Y	Z	Radius	Connection End1	End2	Pulse No.
0	0	0	0.2911	-1	1	1
0	0	2.77315	0.2911	1	1	2
0	0	5.5463	0.2911	1	1	3
0	0	8.31945	0.2911	1	1	4
0	0	11.0926	0.2911	1	1	5
0	0	13.86575	0.2911	1	1	6
0	0	16.6389	0.2911	1	1	7
0	0	19.41205	0.2911	1	1	8
0	0	22.1852	0.2911	1	1	9
0	0	24.95835	0.2911	1	1	10
0	0	27.7315	0.2911	1	1	11
0	0	30.50465	0.2911	1	1	12
0	0	33.2778	0.2911	1	1	13
0	0	36.05095	0.2911	1	1	14
0	0	38.8241	0.2911	1	1	15
0	0	41.59725	0.2911	1	1	16
0	0	44.3704	0.2911	1	1	17
0	0	47.14355	0.2911	1	1	18
0	0	49.9167	0.2911	1	1	19
0	0	52.68985	0.2911	1	0	20

Wire No. 2 Coordinates				Connection		Pulse
X	Y	Z	Radius	End1	End2	No.
87.77235	91.20896	0	0.2911	-2	2	21
87.77235	91.20896	3.051298	0.2911	2	2	22
87.77235	91.20896	6.102595	0.2911	2	2	23
87.77235	91.20896	9.153893	0.2911	2	2	24
87.77235	91.20896	12.20519	0.2911	2	2	25
87.77235	91.20896	15.25649	0.2911	2	2	26
87.77235	91.20896	18.30779	0.2911	2	2	27
87.77235	91.20896	21.35909	0.2911	2	2	28
87.77235	91.20896	24.41038	0.2911	2	2	29
87.77235	91.20896	27.46168	0.2911	2	2	30
87.77235	91.20896	30.51298	0.2911	2	2	31
87.77235	91.20896	33.56428	0.2911	2	2	32
87.77235	91.20896	36.61557	0.2911	2	2	33
87.77235	91.20896	39.66687	0.2911	2	2	34
87.77235	91.20896	42.71817	0.2911	2	2	35
87.77235	91.20896	45.76947	0.2911	2	2	36
87.77235	91.20896	48.82076	0.2911	2	2	37
87.77235	91.20896	51.87206	0.2911	2	2	38
87.77235	91.20896	54.92336	0.2911	2	2	39
87.77235	91.20896	57.97466	0.2911	2	0	40

Wire No. 3 Coordinates				Connection		Pulse
X	Y	Z	Radius	End1	End2	No.
44.78654	131.5596	0	0.2911	-3	3	41
44.78654	131.5596	3.064622	0.2911	3	3	42
44.78654	131.5596	6.129245	0.2911	3	3	43
44.78654	131.5596	9.193867	0.2911	3	3	44
44.78654	131.5596	12.25849	0.2911	3	3	45
44.78654	131.5596	15.32311	0.2911	3	3	46
44.78654	131.5596	18.38773	0.2911	3	3	47
44.78654	131.5596	21.45236	0.2911	3	3	48
44.78654	131.5596	24.51698	0.2911	3	3	49
44.78654	131.5596	27.5816	0.2911	3	3	50
44.78654	131.5596	30.64622	0.2911	3	3	51
44.78654	131.5596	33.71085	0.2911	3	3	52
44.78654	131.5596	36.77547	0.2911	3	3	53
44.78654	131.5596	39.84009	0.2911	3	3	54
44.78654	131.5596	42.90471	0.2911	3	3	55
44.78654	131.5596	45.96934	0.2911	3	3	56
44.78654	131.5596	49.03396	0.2911	3	3	57
44.78654	131.5596	52.09858	0.2911	3	3	58
44.78654	131.5596	55.1632	0.2911	3	3	59
44.78654	131.5596	58.22783	0.2911	3	0	60

Wire No. 4 Coordinates				Connection		Pulse
X	Y	Z	Radius	End1	End2	No.
-39.20266	41.60085	0	0.2911	-4	4	61
-39.27348	41.676	2.81812	0.2911	4	4	62
-39.3443	41.75116	5.63624	0.2911	4	4	63
-39.41512	41.82631	8.45436	0.2911	4	4	64
-39.48594	41.90146	11.27248	0.2911	4	4	65
-39.55676	41.97662	14.0906	0.2911	4	4	66
-39.62758	42.05177	16.90872	0.2911	4	4	67
-39.6984	42.12692	19.72684	0.2911	4	4	68
-39.76922	42.20207	22.54496	0.2911	4	4	69
-39.84004	42.27723	25.36308	0.2911	4	4	70
-39.91087	42.35238	28.1812	0.2911	4	4	71

Wire No. 4 Coordinates				Connection		Pulse
X	Y	Z	Radius	End1	End2	No.
-39.98169	42.42753	30.99932	0.2911	4	4	72
-40.05251	42.50269	33.81744	0.2911	4	4	73
-40.12333	42.57784	36.63556	0.2911	4	4	74
-40.19415	42.65299	39.45368	0.2911	4	4	75
-40.26497	42.72814	42.2718	0.2911	4	4	76
-40.33579	42.8033	45.08992	0.2911	4	4	77
-40.40661	42.87845	47.90804	0.2911	4	4	78
-40.47743	42.9536	50.72616	0.2911	4	4	79
-40.54825	43.02876	53.54428	0.2911	4	0	80

Sources: 1
Pulse No., Voltage Magnitude, Phase (Degrees): 1, 1.0, 0.0

Number of Loads: 3
Pulse No., Resistance, Reactance: 21 , 0 ,-15000
Pulse No., Resistance, Reactance: 41 , 0 ,-15000
Pulse No., Resistance, Reactance: 61 , 0 ,-15000

********** SOURCE DATA **********
Pulse 1 Voltage = (1.0, 0.0j)
Current = (0.0268, 0.0102j)
Impedance = (32.576, -12.39j)
Power = 0.013409 Watts

WCAP - KZDC TWR-1 CAL
WCAP OUTPUT AT FREQUENCY: 1.250 MHz

NODE VOLTAGES
Node: 1 34.8900 ∠ -21.3884° V
Node: 2 58.9095 ∠ 56.3753° V
Node: 3 59.4691 ∠ 55.5730° V

	WCAP PART		BRANCH VOLTAGE	BRANCH CURRENT
R	3→2	1.00000000	1.00 ∠ 0.000° V	1.00 ∠ 0.000° A
C	2→0	**0.00000850**	58.91 ∠ 56.375° V	0.00 ∠ 146.375° A
C	1→0	**0.00003000**	34.89 ∠ -21.388° V	0.01 ∠ 68.612° A
L	2→1	**7.84000000**	61.78 ∠ 89.876° V	**1.00 ∠ -0.124° A**
R	1→0	32.60000000	34.89 ∠ -21.388° V	1.00 ∠ -0.563° A

	WCAP PART		FROM IMPEDANCE	TO IMPEDANCE
R	3→2	1.00000000	33.62 + j 49.053	32.62 + j 49.053
C	2→0	**0.00000850**	0.00 - j 14979.289	0.00 + j 0.000
C	1→0	**0.00003000**	0.00 - j 4244.132	0.00 + j 0.000
L	2→1	**7.84000000**	**32.41 + j 48.963**	32.41 - j 12.612
R	1→0	32.60000000	**32.60 - j 12.400**	0.00 + j 0.000

WCAP INPUT DATA:
1.2500 0.00000000 0
R 1.00000000 3 2 0.00000000
C 0.00000850 2 0
C 0.00003000 1 0
L 7.84000000 2 1 0.00000000
I 1.00000000 0 3 0.00000000
R 32.60000000 1 0 -12.40000000

****
ACSModel
(MININEC 3.1 Core)
08-14-2010 15:06:11
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KZDC
DAYTIME ARRAY
T-2E CAL
Frequency = 1.250 MHz Wavelength = 239.84000 Meters

No. of Wires: 4

Wire No. 1 Coordinates X	Y	Z	Radius	End Connection	No. of Segments
0	0	0		-1	
0	0	55.463	0.2911	0	20

Wire No. 2 Coordinates X	Y	Z	Radius	End Connection	No. of Segments
87.77235	91.20896	0		-2	
87.77235	91.20896	**61.02596**	**0.2911**	0	20

Wire No. 3 Coordinates X	Y	Z	Radius	End Connection	No. of Segments
44.78654	131.5596	0		-3	
44.78654	131.5596	61.29245	0.2911	0	20

Wire No. 4 Coordinates X	Y	Z	Radius	End Connection	No. of Segments
-39.20266	41.60085	0		-4	
-40.61907	43.10391	56.3624	0.2911	0	20

**** ANTENNA GEOMETRY ****

Wire No. 1 Coordinates X	Y	Z	Radius	Connection End1	End2	Pulse No.
0	0	0	0.2911	-1	1	1
0	0	2.77315	0.2911	1	1	2
0	0	5.5463	0.2911	1	1	3
0	0	8.31945	0.2911	1	1	4
0	0	11.0926	0.2911	1	1	5
0	0	13.86575	0.2911	1	1	6
0	0	16.6389	0.2911	1	1	7
0	0	19.41205	0.2911	1	1	8
0	0	22.1852	0.2911	1	1	9
0	0	24.95835	0.2911	1	1	10
0	0	27.7315	0.2911	1	1	11
0	0	30.50465	0.2911	1	1	12
0	0	33.2778	0.2911	1	1	13
0	0	36.05095	0.2911	1	1	14
0	0	38.8241	0.2911	1	1	15
0	0	41.59725	0.2911	1	1	16
0	0	44.3704	0.2911	1	1	17
0	0	47.14355	0.2911	1	1	18
0	0	49.9167	0.2911	1	1	19
0	0	52.68985	0.2911	1	0	20

Wire No. 2 Coordinates				Connection		Pulse
X	Y	Z	Radius	End1	End2	No.
87.77235	91.20896	0	0.2911	-2	2	21
87.77235	91.20896	3.051298	0.2911	2	2	22
87.77235	91.20896	6.102595	0.2911	2	2	23
87.77235	91.20896	9.153893	0.2911	2	2	24
87.77235	91.20896	12.20519	0.2911	2	2	25
87.77235	91.20896	15.25649	0.2911	2	2	26
87.77235	91.20896	18.30779	0.2911	2	2	27
87.77235	91.20896	21.35909	0.2911	2	2	28
87.77235	91.20896	24.41038	0.2911	2	2	29
87.77235	91.20896	27.46168	0.2911	2	2	30
87.77235	91.20896	30.51298	0.2911	2	2	31
87.77235	91.20896	33.56428	0.2911	2	2	32
87.77235	91.20896	36.61557	0.2911	2	2	33
87.77235	91.20896	39.66687	0.2911	2	2	34
87.77235	91.20896	42.71817	0.2911	2	2	35
87.77235	91.20896	45.76947	0.2911	2	2	36
87.77235	91.20896	48.82076	0.2911	2	2	37
87.77235	91.20896	51.87206	0.2911	2	2	38
87.77235	91.20896	54.92336	0.2911	2	2	39
87.77235	91.20896	57.97466	0.2911	2	0	40

Wire No. 3 Coordinates				Connection		Pulse
X	Y	Z	Radius	End1	End2	No.
44.78654	131.5596	0	0.2911	-3	3	41
44.78654	131.5596	3.064622	0.2911	3	3	42
44.78654	131.5596	6.129245	0.2911	3	3	43
44.78654	131.5596	9.193867	0.2911	3	3	44
44.78654	131.5596	12.25849	0.2911	3	3	45
44.78654	131.5596	15.32311	0.2911	3	3	46
44.78654	131.5596	18.38773	0.2911	3	3	47
44.78654	131.5596	21.45236	0.2911	3	3	48
44.78654	131.5596	24.51698	0.2911	3	3	49
44.78654	131.5596	27.5816	0.2911	3	3	50
44.78654	131.5596	30.64622	0.2911	3	3	51
44.78654	131.5596	33.71085	0.2911	3	3	52
44.78654	131.5596	36.77547	0.2911	3	3	53
44.78654	131.5596	39.84009	0.2911	3	3	54
44.78654	131.5596	42.90471	0.2911	3	3	55
44.78654	131.5596	45.96934	0.2911	3	3	56
44.78654	131.5596	49.03396	0.2911	3	3	57
44.78654	131.5596	52.09858	0.2911	3	3	58
44.78654	131.5596	55.1632	0.2911	3	3	59
44.78654	131.5596	58.22783	0.2911	3	0	60

Wire No. 4 Coordinates				Connection		Pulse
X	Y	Z	Radius	End1	End2	No.
-39.20266	41.60085	0	0.2911	-4	4	61
-39.27348	41.676	2.81812	0.2911	4	4	62
-39.3443	41.75116	5.63624	0.2911	4	4	63
-39.41512	41.82631	8.45436	0.2911	4	4	64
-39.48594	41.90146	11.27248	0.2911	4	4	65
-39.55676	41.97662	14.0906	0.2911	4	4	66
-39.62758	42.05177	16.90872	0.2911	4	4	67
-39.6984	42.12692	19.72684	0.2911	4	4	68
-39.76922	42.20207	22.54496	0.2911	4	4	69
-39.84004	42.27723	25.36308	0.2911	4	4	70
-39.91087	42.35238	28.1812	0.2911	4	4	71

Wire No. 4 Coordinates				Connection		Pulse
X	Y	Z	Radius	End1	End2	No.
-39.98169	42.42753	30.99932	0.2911	4	4	72
-40.05251	42.50269	33.81744	0.2911	4	4	73
-40.12333	42.57784	36.63556	0.2911	4	4	74
-40.19415	42.65299	39.45368	0.2911	4	4	75
-40.26497	42.72814	42.2718	0.2911	4	4	76
-40.33579	42.8033	45.08992	0.2911	4	4	77
-40.40661	42.87845	47.90804	0.2911	4	4	78
-40.47743	42.9536	50.72616	0.2911	4	4	79
-40.54825	43.02876	53.54428	0.2911	4	0	80

Sources: 1
Pulse No., Voltage Magnitude, Phase (Degrees): 21, 1.0, 0.0

Number of Loads: 3
Pulse No., Resistance, Reactance: 1 , 0 ,-15000
Pulse No., Resistance, Reactance: 41 , 0 ,-15000
Pulse No., Resistance, Reactance: 61 , 0 ,-15000

********** SOURCE DATA **********
Pulse 21 Voltage = (1.0, 0.0j)
Current = (0.0157, -0.0103j)
Impedance = (**44.54, 29.325j**)
Power = 0.007831 Watts

WCAP - KZDC TWR-2 CAL

WCAP OUTPUT AT FREQUENCY: 1.250 MHz

NODE VOLTAGES
Node: 1 53.9835 ∠ 32.5862° V
Node: 2 91.7609 ∠ 60.1742° V
Node: 3 92.2623 ∠ 59.6354° V

	WCAP PART		BRANCH VOLTAGE		BRANCH CURRENT	
R	3→2	1.00000000	1.00 ∠	0.000° V	1.00 ∠	0.000° A
C	2→0	**0.00000850**	91.76 ∠	60.174° V	0.01 ∠	150.174° A
C	1→0	**0.00003000**	53.98 ∠	32.586° V	0.01 ∠	122.586° A
L	2→1	**6.40000000**	50.53 ∠	89.826° V	**1.01 ∠**	**-0.174° A**
R	1→0	44.54000000	53.98 ∠	32.586° V	1.01 ∠	-0.779° A

	WCAP PART		FROM IMPEDANCE		TO IMPEDANCE	
R	3→2	1.00000000	46.64 + j	79.606	45.64 + j	79.606
C	2→0	**0.00000850**	0.00 - j	14979.289	0.00 + j	0.000
C	1→0	**0.00003000**	-0.00 - j	4244.132	0.00 + j	0.000
L	2→1	**6.40000000**	**45.16 + j**	**79.322**	45.16 + j	29.057
R	1→0	44.54000000	**44.54 + j**	**29.330**	0.00 + j	0.000

WCAP INPUT DATA:

	1.2500	0.00000000	0	
R	1.00000000	3	2	0.00000000
C	0.00000850	2	0	
C	0.00003000	1	0	
L	6.40000000	2	1	0.00000000
I	1.00000000	0	3	0.00000000
R	44.54000000	1	0	29.33000000

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ACSModel
(MININEC 3.1 Core)
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KZDC
DAYTIME ARRAY
T-3E CAL

Frequency = 1.250 MHz Wavelength = 239.84000 Meters

No. of Wires: 4

Wire No. 1 Coordinates X	Y	Z	Radius	End Connection	No. of Segments
0	0	0		-1	
0	0	55.463	0.2911	0	20

Wire No. 2 Coordinates X	Y	Z	Radius	End Connection	No. of Segments
87.77235	91.20896	0		-2	
87.77235	91.20896	61.02596	0.2911	0	20

Wire No. 3 Coordinates X	Y	Z	Radius	End Connection	No. of Segments
44.78654	131.5596	0		-3	
44.78654	131.5596	**61.29245**	**0.2911**	0	20

Wire No. 4 Coordinates X	Y	Z	Radius	End Connection	No. of Segments
-39.20266	41.60085	0		-4	
-40.61907	43.10391	56.3624	0.2911	0	20

**** ANTENNA GEOMETRY ****

Wire No. 1 Coordinates X	Y	Z	Radius	Connection End1	End2	Pulse No.
0	0	0	0.2911	-1	1	1
0	0	2.77315	0.2911	1	1	2
0	0	5.5463	0.2911	1	1	3
0	0	8.31945	0.2911	1	1	4
0	0	11.0926	0.2911	1	1	5
0	0	13.86575	0.2911	1	1	6
0	0	16.6389	0.2911	1	1	7
0	0	19.41205	0.2911	1	1	8
0	0	22.1852	0.2911	1	1	9
0	0	24.95835	0.2911	1	1	10
0	0	27.7315	0.2911	1	1	11
0	0	30.50465	0.2911	1	1	12
0	0	33.2778	0.2911	1	1	13
0	0	36.05095	0.2911	1	1	14
0	0	38.8241	0.2911	1	1	15
0	0	41.59725	0.2911	1	1	16
0	0	44.3704	0.2911	1	1	17
0	0	47.14355	0.2911	1	1	18
0	0	49.9167	0.2911	1	1	19

Wire No. 2 Coordinates				Connection		Pulse
X	Y	Z	Radius	End1	End2	No.
0	0	52.68985	0.2911	1	0	20
87.77235	91.20896	0	0.2911	-2	2	21
87.77235	91.20896	3.051298	0.2911	2	2	22
87.77235	91.20896	6.102595	0.2911	2	2	23
87.77235	91.20896	9.153893	0.2911	2	2	24
87.77235	91.20896	12.20519	0.2911	2	2	25
87.77235	91.20896	15.25649	0.2911	2	2	26
87.77235	91.20896	18.30779	0.2911	2	2	27
87.77235	91.20896	21.35909	0.2911	2	2	28
87.77235	91.20896	24.41038	0.2911	2	2	29
87.77235	91.20896	27.46168	0.2911	2	2	30
87.77235	91.20896	30.51298	0.2911	2	2	31
87.77235	91.20896	33.56428	0.2911	2	2	32
87.77235	91.20896	36.61557	0.2911	2	2	33
87.77235	91.20896	39.66687	0.2911	2	2	34
87.77235	91.20896	42.71817	0.2911	2	2	35
87.77235	91.20896	45.76947	0.2911	2	2	36
87.77235	91.20896	48.82076	0.2911	2	2	37
87.77235	91.20896	51.87206	0.2911	2	2	38
87.77235	91.20896	54.92336	0.2911	2	2	39
87.77235	91.20896	57.97466	0.2911	2	0	40

Wire No. 3 Coordinates				Connection		Pulse
X	Y	Z	Radius	End1	End2	No.
44.78654	131.5596	0	0.2911	-3	3	41
44.78654	131.5596	3.064622	0.2911	3	3	42
44.78654	131.5596	6.129245	0.2911	3	3	43
44.78654	131.5596	9.193867	0.2911	3	3	44
44.78654	131.5596	12.25849	0.2911	3	3	45
44.78654	131.5596	15.32311	0.2911	3	3	46
44.78654	131.5596	18.38773	0.2911	3	3	47
44.78654	131.5596	21.45236	0.2911	3	3	48
44.78654	131.5596	24.51698	0.2911	3	3	49
44.78654	131.5596	27.5816	0.2911	3	3	50
44.78654	131.5596	30.64622	0.2911	3	3	51
44.78654	131.5596	33.71085	0.2911	3	3	52
44.78654	131.5596	36.77547	0.2911	3	3	53
44.78654	131.5596	39.84009	0.2911	3	3	54
44.78654	131.5596	42.90471	0.2911	3	3	55
44.78654	131.5596	45.96934	0.2911	3	3	56
44.78654	131.5596	49.03396	0.2911	3	3	57
44.78654	131.5596	52.09858	0.2911	3	3	58
44.78654	131.5596	55.1632	0.2911	3	3	59
44.78654	131.5596	58.22783	0.2911	3	0	60

Wire No. 4 Coordinates				Connection		Pulse
X	Y	Z	Radius	End1	End2	No.
-39.20266	41.60085	0	0.2911	-4	4	61
-39.27348	41.676	2.81812	0.2911	4	4	62
-39.3443	41.75116	5.63624	0.2911	4	4	63
-39.41512	41.82631	8.45436	0.2911	4	4	64
-39.48594	41.90146	11.27248	0.2911	4	4	65
-39.55676	41.97662	14.0906	0.2911	4	4	66
-39.62758	42.05177	16.90872	0.2911	4	4	67
-39.6984	42.12692	19.72684	0.2911	4	4	68
-39.76922	42.20207	22.54496	0.2911	4	4	69
-39.84004	42.27723	25.36308	0.2911	4	4	70

Wire No. 4 Coordinates				Connection		Pulse
X	Y	Z	Radius	End1	End2	No.
-39.91087	42.35238	28.1812	0.2911	4	4	71
-39.98169	42.42753	30.99932	0.2911	4	4	72
-40.05251	42.50269	33.81744	0.2911	4	4	73
-40.12333	42.57784	36.63556	0.2911	4	4	74
-40.19415	42.65299	39.45368	0.2911	4	4	75
-40.26497	42.72814	42.2718	0.2911	4	4	76
-40.33579	42.8033	45.08992	0.2911	4	4	77
-40.40661	42.87845	47.90804	0.2911	4	4	78
-40.47743	42.9536	50.72616	0.2911	4	4	79
-40.54825	43.02876	53.54428	0.2911	4	0	80

Sources: 1
Pulse No., Voltage Magnitude, Phase (Degrees): 41, 1.0, 0.0

Number of Loads: 3
Pulse No., Resistance, Reactance: 1 , 0 ,-15000
Pulse No., Resistance, Reactance: 21 , 0 ,-15000
Pulse No., Resistance, Reactance: 61 , 0 ,-15000

********** SOURCE DATA **********
Pulse 41 Voltage = (1.0, 0.0j)
Current = (0.0149, -0.0104j)
Impedance = (45.255, 31.469j)
Power = 0.007447 Watts

WCAP - KZDC TWR-3 CAL

WCAP OUTPUT AT FREQUENCY: 1.250 MHz

NODE VOLTAGES
Node: 1 55.8132 ∠ 34.0194° V
Node: 2 88.3543 ∠ 58.3240° V
Node: 3 88.8835 ∠ 57.7754° V

	WCAP PART		BRANCH VOLTAGE	BRANCH CURRENT
R	3→2	1.00000000	1.00 ∠ 0.000° V	1.00 ∠ 0.000° A
C	2→0	**0.00000850**	88.35 ∠ 58.324° V	0.01 ∠ 148.324° A
C	1→0	**0.00003000**	55.81 ∠ 34.019° V	0.01 ∠ 124.019° A
L	2→1	**5.57000000**	43.97 ∠ 89.823° V	**1.01 ∠ -0.177° A**
R	1→0	45.26000000	55.81 ∠ 34.019° V	1.01 ∠ -0.792° A

	WCAP PART		FROM IMPEDANCE	TO IMPEDANCE
R	3→2	1.00000000	47.40 + j 75.192	46.40 + j 75.192
C	2→0	**0.00000850**	-0.00 - j 14979.289	0.00 + j 0.000
C	1→0	**0.00003000**	0.00 - j 4244.132	0.00 + j 0.000
L	2→1	**5.57000000**	**45.93 + j 74.958**	45.93 + j 31.212
R	1→0	45.26000000	**45.26 + j 31.470**	0.00 + j 0.000

WCAP INPUT DATA:

	1.2500	0.00000000	0	
R	1.00000000	3	2	0.00000000
C	0.00000850	2	0	
C	0.00003000	1	0	
L	5.57000000	2	1	0.00000000
I	1.00000000	0	3	0.00000000
R	45.26000000	1	0	31.47000000

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ACSModel
(MININEC 3.1 Core)
08-14-2010 15:09:17
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KZDC
DAYTIME ARRAY
T-4E CAL

Frequency = 1.250 MHz Wavelength = 239.84000 Meters

No. of Wires: 4

Wire No. 1 Coordinates X	Y	Z	Radius	End Connection	No. of Segments
0	0	0		-1	
0	0	55.463	0.2911	0	20

Wire No. 2 Coordinates X	Y	Z	Radius	End Connection	No. of Segments
87.77235	91.20896	0		-2	
87.77235	91.20896	61.02596	0.2911	0	20

Wire No. 3 Coordinates X	Y	Z	Radius	End Connection	No. of Segments
44.78654	131.5596	0		-3	
44.78654	131.5596	61.29245	0.2911	0	20

Wire No. 4 Coordinates X	Y	Z	Radius	End Connection	No. of Segments
-39.20266	41.60085	0		-4	
-40.61907	43.10391	**56.3624**	**0.2911**	0	20

**** ANTENNA GEOMETRY ****

Wire No. 1 Coordinates X	Y	Z	Radius	Connection End1	End2	Pulse No.
0	0	0	0.2911	-1	1	1
0	0	2.77315	0.2911	1	1	2
0	0	5.5463	0.2911	1	1	3
0	0	8.31945	0.2911	1	1	4
0	0	11.0926	0.2911	1	1	5
0	0	13.86575	0.2911	1	1	6
0	0	16.6389	0.2911	1	1	7
0	0	19.41205	0.2911	1	1	8
0	0	22.1852	0.2911	1	1	9
0	0	24.95835	0.2911	1	1	10
0	0	27.7315	0.2911	1	1	11
0	0	30.50465	0.2911	1	1	12
0	0	33.2778	0.2911	1	1	13
0	0	36.05095	0.2911	1	1	14
0	0	38.8241	0.2911	1	1	15
0	0	41.59725	0.2911	1	1	16
0	0	44.3704	0.2911	1	1	17
0	0	47.14355	0.2911	1	1	18
0	0	49.9167	0.2911	1	1	19

Wire No. 4 Coordinates				Connection		Pulse
X	Y	Z	Radius	End1	End2	No.
-39.91087	42.35238	28.1812	0.2911	4	4	71
-39.98169	42.42753	30.99932	0.2911	4	4	72
-40.05251	42.50269	33.81744	0.2911	4	4	73
-40.12333	42.57784	36.63556	0.2911	4	4	74
-40.19415	42.65299	39.45368	0.2911	4	4	75
-40.26497	42.72814	42.2718	0.2911	4	4	76
-40.33579	42.8033	45.08992	0.2911	4	4	77
-40.40661	42.87845	47.90804	0.2911	4	4	78
-40.47743	42.9536	50.72616	0.2911	4	4	79
-40.54825	43.02876	53.54428	0.2911	4	0	80

Sources: 1
Pulse No., Voltage Magnitude, Phase (Degrees): 61, 1.0, 0.0

Number of Loads: 3
Pulse No., Resistance, Reactance: 1 , 0 ,-15000
Pulse No., Resistance, Reactance: 21 , 0 ,-15000
Pulse No., Resistance, Reactance: 41 , 0 ,-15000

********** SOURCE DATA **********
Pulse 61 Voltage = (1.0, 0.0j)
Current = (0.0283, 0.0044j)
Impedance = (**34.475, -5.405**j)
Power = 0.014155 Watts

WCAP - KZDC TWR-4 CAL

WCAP OUTPUT AT FREQUENCY: 1.250 MHz

NODE VOLTAGES
Node: 1 53.0938 ∠ 49.3668° V
Node: 2 53.7504 ∠ 48.5578° V
Node: 3 34.9501 ∠ -9.5139° V

	WCAP PART		BRANCH VOLTAGE		BRANCH CURRENT	
R	2→1	1.00000000	1.00 ∠	0.000° V	1.00 ∠	0.000° A
C	1→0	**0.00000850**	53.09 ∠	49.367° V	0.00 ∠	139.367° A
C	3→0	**0.00003000**	34.95 ∠	-9.514° V	0.01 ∠	80.486° A
L	1→3	**5.85000000**	46.07 ∠	89.868° V	**1.00 ∠**	**-0.132° A**
R	3→0	34.48000000	34.95 ∠	-9.514° V	1.00 ∠	-0.597° A

	WCAP PART		FROM IMPEDANCE		TO IMPEDANCE	
R	2→1	1.00000000	35.58 + j	40.293	34.58 + j	40.293
C	1→0	**0.00000850**	0.00 - j	14979.289	0.00 + j	0.000
C	3→0	**0.00003000**	0.00 - j	4244.132	0.00 + j	0.000
L	1→3	**5.85000000**	**34.39 + j**	**40.264**	34.39 - j	5.682
R	3→0	34.48000000	**34.48 - j**	**5.410**	0.00 + j	0.000

WCAP INPUT DATA:

	1.2500	0.00000000	0	
R	1.00000000	2	1	0.00000000
C	0.00000850	1	0	
C	0.00003000	3	0	
L	5.85000000	1	3	0.00000000
I	1.00000000	0	2	0.00000000
R	34.48000000	3	0	-5.41000000

2) Derivation of Operating Parameters for Daytime Directional Antenna

Once the Method of Moments model was calibrated against the measured antenna coupler output impedances, the model was utilized for the daytime directional antenna calculations. These calculations were used to determine the complex voltage source values to be applied at ground level for each tower of the array to produce the theoretical field parameters which, when normalized to the reference tower, equate to the theoretical field parameters of the authorized pattern. These voltage sources were then applied in the model and the tower currents were calculated.

Twenty segments were used for each tower. The current samples for the KZDC towers are derived from Phasetek toroidal current transformers located within the antenna coupling unit cabinets in the output feed line to the tower. As such, the first (ground) segment of each tower was used to determine the modeled operating parameters of the array.

A circuit model was constructed to determine the effect of the series feed inductance, shunt static drain choke reactance, and base region shunt capacitance on the antenna coupler output. The static drain chokes are reported by the manufacturer to have a capacitive reactance of approximately 15,000 ohms at the 1250 kilohertz operating frequency. Since the towers are not lighted and there are no other shunt circuits present in the networks, the model is identical to the one developed for the model calibration.

The following table lists the tabulated results along with the base operating parameters for the daytime array.

TWR	NODE	CURRENT MAGNITUDE (AMPERES)	CURRENT PHASE (DEGREES)	WCAP CURRENT OFFSET FOR UNITY Ibase	WCAP PHASE OFFSET FOR UNITY PHASE (DEGS)	ANTENNA MONITOR RATIO REF TWR-2	ANTENNA MONITOR PHASE REF TWR-2 (DEGREES)
1	1	24.34	4.26	1.00	+0.51	1.36	+24.2
2	21	17.88	-19.43	1.00	+0.00	1.00	0.0
3	41	23.06	74.62	0.99	+0.86	1.28	+94.9
4	61	17.53	85.68	1.01	+0.97	0.99	+106.1

The resulting operating specifications for the KZDC Antenna System are as follows:

DAYTIME ANTENNA SYSTEM

Power = 25,000 watts X 1.05 = 26,250 Watts

I_{CP} = $(26,250/50)^{1/2}$ = **22.9 Amperes**

Tower 1: 1.360/+24.2°

Tower 2: 1.000/+ 0.0°

Tower 3: 1.280/+94.9°

Tower 4: 0.990/+106.1°

DAYTIME ARRAY DATA FILES FOLLOW

****
ACSModel
(MININEC 3.1 Core)
08-24-2010 13:32:28
****

KZDC
DAYTIME ANTENNA MODEL
4 TOWER ARRAY

Frequency = 1.250 MHz Wavelength = 239.84000 Meters

No. of Wires: 4

Wire No. 1 Coordinates X	Y	Z	Radius	End Connection	No. of Segments
0	0	0		-1	
0	0	55.463	0.2911	0	20

Wire No. 2 Coordinates X	Y	Z	Radius	End Connection	No. of Segments
87.77235	91.20896	0		-2	
87.77235	91.20896	61.02596	0.2911	0	20

Wire No. 3 Coordinates X	Y	Z	Radius	End Connection	No. of Segments
44.78654	131.5596	0		-3	
44.78654	131.5596	61.29245	0.2911	0	20

Wire No. 4 Coordinates X	Y	Z	Radius	End Connection	No. of Segments
-39.20266	41.60085	0		-4	
-40.61907	43.10391	56.3624	0.2911	0	20

**** ANTENNA GEOMETRY ****

Wire No. 1 Coordinates X	Y	Z	Radius	Connection End1	End2	Pulse No.
0	0	0	0.2911	-1	1	1
0	0	2.77315	0.2911	1	1	2
0	0	5.5463	0.2911	1	1	3
0	0	8.31945	0.2911	1	1	4
0	0	11.0926	0.2911	1	1	5
0	0	13.86575	0.2911	1	1	6
0	0	16.6389	0.2911	1	1	7
0	0	19.41205	0.2911	1	1	8
0	0	22.1852	0.2911	1	1	9
0	0	24.95835	0.2911	1	1	10
0	0	27.7315	0.2911	1	1	11
0	0	30.50465	0.2911	1	1	12
0	0	33.2778	0.2911	1	1	13
0	0	36.05095	0.2911	1	1	14
0	0	38.8241	0.2911	1	1	15
0	0	41.59725	0.2911	1	1	16
0	0	44.3704	0.2911	1	1	17
0	0	47.14355	0.2911	1	1	18
0	0	49.9167	0.2911	1	1	19
0	0	52.68985	0.2911	1	0	20

Wire No. 2 Coordinates				Connection		Pulse
X	Y	Z	Radius	End1	End2	No.
87.77235	91.20896	0	0.2911	-2	2	21
87.77235	91.20896	3.051298	0.2911	2	2	22
87.77235	91.20896	6.102595	0.2911	2	2	23
87.77235	91.20896	9.153893	0.2911	2	2	24
87.77235	91.20896	12.20519	0.2911	2	2	25
87.77235	91.20896	15.25649	0.2911	2	2	26
87.77235	91.20896	18.30779	0.2911	2	2	27
87.77235	91.20896	21.35909	0.2911	2	2	28
87.77235	91.20896	24.41038	0.2911	2	2	29
87.77235	91.20896	27.46168	0.2911	2	2	30
87.77235	91.20896	30.51298	0.2911	2	2	31
87.77235	91.20896	33.56428	0.2911	2	2	32
87.77235	91.20896	36.61557	0.2911	2	2	33
87.77235	91.20896	39.66687	0.2911	2	2	34
87.77235	91.20896	42.71817	0.2911	2	2	35
87.77235	91.20896	45.76947	0.2911	2	2	36
87.77235	91.20896	48.82076	0.2911	2	2	37
87.77235	91.20896	51.87206	0.2911	2	2	38
87.77235	91.20896	54.92336	0.2911	2	2	39
87.77235	91.20896	57.97466	0.2911	2	0	40

Wire No. 3 Coordinates				Connection		Pulse
X	Y	Z	Radius	End1	End2	No.
44.78654	131.5596	0	0.2911	-3	3	41
44.78654	131.5596	3.064622	0.2911	3	3	42
44.78654	131.5596	6.129245	0.2911	3	3	43
44.78654	131.5596	9.193867	0.2911	3	3	44
44.78654	131.5596	12.25849	0.2911	3	3	45
44.78654	131.5596	15.32311	0.2911	3	3	46
44.78654	131.5596	18.38773	0.2911	3	3	47
44.78654	131.5596	21.45236	0.2911	3	3	48
44.78654	131.5596	24.51698	0.2911	3	3	49
44.78654	131.5596	27.5816	0.2911	3	3	50
44.78654	131.5596	30.64622	0.2911	3	3	51
44.78654	131.5596	33.71085	0.2911	3	3	52
44.78654	131.5596	36.77547	0.2911	3	3	53
44.78654	131.5596	39.84009	0.2911	3	3	54
44.78654	131.5596	42.90471	0.2911	3	3	55
44.78654	131.5596	45.96934	0.2911	3	3	56
44.78654	131.5596	49.03396	0.2911	3	3	57
44.78654	131.5596	52.09858	0.2911	3	3	58
44.78654	131.5596	55.1632	0.2911	3	3	59
44.78654	131.5596	58.22783	0.2911	3	0	60

Wire No. 4 Coordinates				Connection		Pulse
X	Y	Z	Radius	End1	End2	No.
-39.20266	41.60085	0	0.2911	-4	4	61
-39.27348	41.676	2.81812	0.2911	4	4	62
-39.3443	41.75116	5.63624	0.2911	4	4	63
-39.41512	41.82631	8.45436	0.2911	4	4	64
-39.48594	41.90146	11.27248	0.2911	4	4	65
-39.55676	41.97662	14.0906	0.2911	4	4	66
-39.62758	42.05177	16.90872	0.2911	4	4	67
-39.6984	42.12692	19.72684	0.2911	4	4	68
-39.76922	42.20207	22.54496	0.2911	4	4	69
-39.84004	42.27723	25.36308	0.2911	4	4	70
-39.91087	42.35238	28.1812	0.2911	4	4	71
-39.98169	42.42753	30.99932	0.2911	4	4	72
-40.05251	42.50269	33.81744	0.2911	4	4	73
-40.12333	42.57784	36.63556	0.2911	4	4	74
-40.19415	42.65299	39.45368	0.2911	4	4	75
-40.26497	42.72814	42.2718	0.2911	4	4	76
-40.33579	42.8033	45.08992	0.2911	4	4	77
-40.40661	42.87845	47.90804	0.2911	4	4	78
-40.47743	42.9536	50.72616	0.2911	4	4	79
-40.54825	43.02876	53.54428	0.2911	4	0	80

Sources: 4
Pulse No., Voltage Magnitude, Phase (Degrees): 1, 997.9, -22.8
Pulse No., Voltage Magnitude, Phase (Degrees): 21, 1429.7, 4.1
Pulse No., Voltage Magnitude, Phase (Degrees): 41, 415.5, 129.2
Pulse No., Voltage Magnitude, Phase (Degrees): 61, 575.1, -7.8

Number of Loads: 0

********** SOURCE DATA **********

Pulse 1
Voltage = (919.6405, -387.3994j)
Current = (24.2724, 1.8065j)
Impedance = (**36.498 -j18.677**)
Power = 10811.04 Watts

Pulse 21
Voltage = (1426.0796, 102.0244j)
Current = (16.8605, -5.948j)
Impedance = (**73.321 +j31.917**)
Power = 11718.77 Watts

Pulse 41
Voltage = (-262.393, 322.2098j)
Current = (6.117, 22.2383j)
Impedance = (**10.453 +j14.674**)
Power = 2780.17 Watts

Pulse 61
Voltage = (569.6763, -78.4985j)
Current = (1.3199, 17.4763j)
Impedance = (**-2.018 -j32.749**)
Power = -309.977600 Watts

Total Power = 24999.999 Watts

********** CURRENT DATA **********

Wire No. 1 :

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)
1	24.2724	1.8065	**24.3396**	**4.2564 /17.88 /-19.43°**
2	23.9785	1.2607	24.0116	3.0097 = **1.36 /23.7°**
3	23.6526	0.9425	23.6714	2.282
4	23.2217	0.6765	23.2316	1.6687
5	22.6808	0.4475	22.6852	1.1304
6	22.0288	0.2483	22.0302	0.6459
7	21.2666	0.0755	21.2667	0.2034
8	20.3962	-0.0729	20.3964	-0.2047
9	19.4206	-0.198	19.4216	-0.5841
10	18.3431	-0.3006	18.3455	-0.9388
11	17.1673	-0.3812	17.1715	-1.272
12	15.8972	-0.4403	15.9033	-1.5865
13	14.537	-0.4783	14.5448	-1.8845
14	13.0903	-0.4955	13.0997	-2.1678
15	11.5606	-0.4922	11.571	-2.4382
16	9.95	-0.4687	9.9611	-2.6971
17	8.2587	-0.425	8.2697	-2.9462
18	6.4823	-0.3609	6.4923	-3.1867
19	4.6055	-0.2753	4.6137	-3.4207
20	2.5912	-0.1655	2.5965	-3.6538
E	0.0	0.0	0.0	0.0

Wire No. 2:

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)	
21	16.8605	-5.948	**17.8789**	**-19.4318**	**REFERENCE**
22	16.8759	-6.8116	18.1987	-21.9803	
23	16.7697	-7.2677	18.2768	-23.4311	
24	16.562	-7.5886	18.2178	-24.6169	
25	16.2559	-7.7997	18.0303	-25.6321	
26	15.854	-7.9134	17.7192	-26.5259	
27	15.3587	-7.936	17.2878	-27.3261	
28	14.7728	-7.8717	16.7392	-28.051	
29	14.0996	-7.7237	16.0765	-28.7137	
30	13.3424	-7.4948	15.3033	-29.3239	
31	12.505	-7.1876	14.4235	-29.8893	
32	11.5912	-6.8049	13.4411	-30.4161	
33	10.6052	-6.3494	12.3606	-30.9092	
34	9.5508	-5.8236	11.1862	-31.373	
35	8.4317	-5.2301	9.9221	-31.8111	
36	7.2509	-4.5709	8.5714	-32.2268	
37	6.01	-3.8469	7.1357	-32.6232	
38	4.7072	-3.0573	5.6129	-33.0032	
39	3.3337	-2.1957	3.9918	-33.3702	
40	1.8637	-1.2445	2.2411	-33.733	
E	0.0	0.0	0.0	0.0	

Wire No. 3:

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)	
41	6.117	22.2383	23.0642	74.6203	/17.88 /-19.43°
42	6.2995	22.3378	23.2091	74.2509	= 1.29 /94.1°
43	6.3641	22.2433	23.1358	74.0336	
44	6.3722	22.0057	22.9097	73.8505	
45	6.33	21.6312	22.5384	73.6888	
46	6.2406	21.1243	22.0268	73.5416	
47	6.1059	20.4888	21.3793	73.4053	
48	5.9274	19.7288	20.6	73.2774	
49	5.7065	18.8485	19.6934	73.1561	
50	5.4445	17.8528	18.6645	73.0401	
51	5.1428	16.7466	17.5185	72.9286	
52	4.8028	15.5353	16.2608	72.8206	
53	4.4261	14.2243	14.897	72.7157	
54	4.014	12.819	13.4328	72.6132	
55	3.5678	11.3244	11.8732	72.5127	
56	3.0886	9.7446	10.2224	72.414	
57	2.5766	8.0817	8.4825	72.3166	
58	2.031	6.3334	6.6511	72.2202	
59	1.4474	4.4877	4.7153	72.1244	
60	0.8142	2.51	2.6387	72.0271	
E	0.0	0.0	0.0	0.0	

Wire No. 4:

Pulse No.	Real (Amps)	Imaginary (Amps)	Magnitude (Amps)	Phase (Degrees)	
61	1.3199	17.4763	17.5261	85.681	/17.88 /-19.43°
62	1.2702	17.0907	17.1378	85.7494	= 0.980 /105.1°
63	1.2347	16.7571	16.8025	85.7859	
64	1.1983	16.3674	16.4113	85.8127	
65	1.1596	15.9133	15.9555	85.8322	
66	1.118	15.3915	15.432	85.8453	
67	1.0732	14.8015	14.8404	85.8529	
68	1.0249	14.1444	14.1815	85.8554	
69	0.9731	13.4217	13.4569	85.8533	
70	0.9175	12.6357	12.669	85.8468	
71	0.8582	11.7888	11.82	85.8362	
72	0.7951	10.8838	10.9128	85.8219	
73	0.728	9.9235	9.9502	85.8042	
74	0.657	8.9106	8.9348	85.7832	
75	0.5819	7.8474	7.869	85.7593	
76	0.5026	6.7356	6.7544	85.7327	
77	0.4189	5.5755	5.5912	85.7037	
78	0.3302	4.3641	4.3766	85.6725	
79	0.2358	3.0917	3.1007	85.6394	
80	0.1333	1.7336	1.7387	85.6037	
E	0.0	0.0	0.0	0.0	

CALCULATION OF DAYTIME OPERATING PARAMETERS
KZDC DAYTIME ARRAY
REV: 1

MININEC TABULATION & CORRECTION FACTORS

TWR	MAG	PHASE	CF MAG	CF PHASE	RES MAG	RES PHASE
1	24.3396	+4.2564°	1.0045	+0.491°	24.4491	+4.7474°
2	17.8789	-19.4318°	0.9928	-0.997°	17.7502	-18.4348°
3	23.0642	+74.6203°	0.9966	+0.142°	22.9858	+74.7623°
4	17.5261	+85.6810°	1.0075	-0.027°	17.6575	+85.6540°

PARAMETERS NORMALIZED TO TOWER-2

TWR	RES MAG	RES PHASE	NORM MAG	NORM PHASE	LIC MAG	LIC PHASE
1	24.4491	+4.7474°	1.3774	23.182°	1.377	23.2°
2	17.7502	-18.4348°	1.000	00.0°	1.000	00.0°
3	22.9858	+74.7623°	1.2950	93.197°	1.295	93.2°
4	17.6575	+85.6540°	0.9948	104.088°	0.995	104.1°

KZDC DA-DAYTIME WCAP FILES
PAGE 1 OF 2
REV: 1

WCAP - KZDC TWR-1 DA-D, REV: 1

WCAP OUTPUT AT FREQUENCY: 1.250 MHz

NODE VOLTAGES

Node: 1 1365.4587 ∠ 53.8226° V

Node: 2 996.4063 ∠-23.4755° V

	WCAP PART		BRANCH VOLTAGE	BRANCH CURRENT	
C	1→0	0.00000850	1365.46 ∠ 53.823° V	0.09 ∠143.823° A	
C	2→0	0.00003000	996.41 ∠-23.475° V	0.23 ∠ 66.525° A	
L	1→2	7.84000000	1502.99 ∠ 94.118° V	24.41 ∠ 4.118° A	24.410÷24.300=1.0045
R	2→0	36.50000000	996.41 ∠-23.475° V	24.30 ∠ 3.627° A	4.118°-3.627°= 0.491°
					C.F.: 1.0045 /0.491°

	WCAP PART		FROM IMPEDANCE	TO IMPEDANCE
C	1→0	0.00000850	0.00 - j14979.289	0.00 + j 0.000
C	2→0	0.00003000	0.00 - j 4244.132	0.00 + j 0.000
L	1→2	7.84000000	**36.18 + j 42.667**	36.18 - j18.908
R	2→0	36.50000000	**36.50 - j 18.680**	0.00 + j 0.000

WCAP INPUT DATA:

	1.2500	0.00000000	0	
C	0.00000850	1	0	
C	0.00003000	2	0	
L	7.84000000	1	2	0.00000000
I	**24.33960000**	0	1	**4.25640000°**
R	36.50000000	2	0	-18.68000000

WCAP - KZDC TWR-2 DA-D, REV: 1

WCAP OUTPUT AT FREQUENCY: 1.250 MHz

NODE VOLTAGES

Node: 1 1447.6772 ∠ 2.8037° V

Node: 2 1978.4562 ∠ 27.7568° V

	WCAP PART		BRANCH VOLTAGE	BRANCH CURRENT	
C	2→0	0.00000850	1978.46 ∠ 27.757° V	0.13 ∠ 117.757° A	
C	1→0	0.00003000	1447.68 ∠ 2.804° V	0.34 ∠ 92.804° A	
L	2→1	6.40000000	903.57 ∠ 70.282° V	17.98 ∠ -19.718° A	17.980÷18.110=0.9928
R	1→0	73.30000000	1447.68 ∠ 2.804° V	18.11 ∠ -20.715° A	-19.718°+20.715°=-0.997°
					C.F.: 0.9928 /-0.997°

	WCAP PART		FROM IMPEDANCE	TO IMPEDANCE
C	2→0	0.00000850	0.00 - j 14979.289	0.00 + j 0.000
C	1→0	0.00003000	0.00 - j 4244.132	0.00 + j 0.000
L	2→1	6.40000000	**74.39 + j 81.113**	74.39 + j 30.847
R	1→0	73.30000000	**73.30 + j 31.900**	0.00 + j 0.000

WCAP INPUT DATA:

	1.2500	0.00000000	0	
C	0.00000850	2	0	
C	0.00003000	1	0	
L	6.40000000	2	1	0.00000000
I	**17.87890000**	0	2	**-19.43180000°**
R	73.30000000	1	0	31.90000000

KZDC DA-DAYTIME WCAP FILES
PAGE 2 OF 2
REV: 1

WCAP - KZDC TWR-3 DA-D, REV: 1
WCAP OUTPUT AT FREQUENCY: 1.250 MHz
NODE VOLTAGES
Node: 1 418.4913 ∠ 128.9746° V
Node: 2 1374.9465 ∠ 154.3730° V

	WCAP PART		BRANCH VOLTAGE	BRANCH CURRENT	
C	2→0	0.00000850	1374.95 ∠154.373° V	0.09 ∠-115.627° A	
C	1→0	0.00003000	418.49 ∠128.975° V	0.10 ∠-141.025° A	
L	2→1	5.57000000	1012.93 ∠164.580° V	23.15 ∠ 74.580° A	23.150÷23.230=0.9966
R	1→0	10.45000000	418.49 ∠128.975° V	23.23 ∠ 74.438° A	74.580°-74.438°=0.142°
					C.F.: 0.9966 /0.142°

	WCAP PART		FROM IMPEDANCE	TO IMPEDANCE
C	2→0	0.00000850	0.00 - j14979.289	0.00 + j 0.000
C	1→0	0.00003000	0.00 - j 4244.132	0.00 + j 0.000
L	2→1	5.57000000	10.52 + j 58.442	10.52 + j14.695
R	1→0	10.45000000	10.45 + j 14.670	0.00 + j 0.000

WCAP INPUT DATA:

	1.2500	0.00000000	0	
C	0.00000850	2	0	
C	0.00003000	1	0	
L	5.57000000	2	1	0.00000000
R	10.45000000	1	0	14.67000000
I	**23.06420000**	0	2	**74.62030000°**

WCAP - KZDC TWR-4 DA-D, REV: 1
WCAP OUTPUT AT FREQUENCY: 1.250 MHz
NODE VOLTAGES
Node: 1 571.1799 ∠ -7.8138° V
Node: 2 238.4286 ∠ -175.8959° V

	WCAP PART		BRANCH VOLTAGE	BRANCH CURRENT	
C	2→0	0.00000850	238.43 ∠-175.896° V	0.02 ∠-85.896° A	
C	1→0	0.00003000	571.18 ∠ -7.814° V	0.13 ∠ 82.186° A	
L	2→1	5.85000000	805.97 ∠ 175.689° V	17.54 ∠ 85.689° A	17.540÷17.410=1.0075
R	1→0	-2.02000000	571.18 ∠ -7.814° V	17.41 ∠ 85.716° A	85.689°-85.716°=-0.027°
					C.F.: 1.0075 /-0.027°

	WCAP PART		FROM IMPEDANCE	TO IMPEDANCE
C	2→0	0.00000850	0.00 - j 14979.289	0.00 + j 0.000
C	1→0	0.00003000	0.00 - j 4244.132	0.00 + j 0.000
L	2→1	5.85000000	**-1.99 + j 13.446**	-1.99 - j 32.500
R	1→0	-2.02000000	**-2.02 - j 32.750**	0.00 + j 0.000

WCAP INPUT DATA:

	1.2500	0.00000000	0	
C	0.00000850	2	0	
C	0.00003000	1	0	
L	5.85000000	2	1	0.00000000
I	**17.52611000**	0	2	**85.68100000°**
R	-2.02000000	1	0	-32.75000000

3) DESCRIPTION OF SAMPLING SYSTEM

The KZDC sampling system consists of Phasetek P600-202 toroidal current transformers installed at the outputs of the four antenna coupling units immediately following the output test jacks (J-Plugs) and prior to the static drain chokes. Samples from the current transformers are connected to equal lengths of 1/2 inch foam dielectric coaxial transmission lines, Andrew type number LDF-4-50A. The transmission lines are terminated at the antenna coupler and transmitter room equipment rack in type N bulkhead fittings and are buried below grade level. Short flexible lines of equal lengths with crimp type matching connectors made from RG-214/U coaxial cable are installed at the rack ends of the run. This cable is included in the measurements for each cable.

The antenna monitor is a Potomac Instruments type number 1901, four element antenna monitor, serial number 795.

Impedance measurements were made on each of the transmission lines, including the flexible pigtails at the monitor end of the system with an Array Solutions model PA-120 vector impedance analyzer coupled to a portable computer. The distant (antenna coupler) end of each line was open circuited for the measurements. The instrument was calibrated immediately prior to making the transmission line measurements with a set of precision loads supplied by the manufacturer.

The table below shows the frequencies above and below the carrier frequency where resonance, defined as zero reactance corresponding with low resistance, was found. As the length of a distortionless transmission line is 180 electrical degrees at the difference frequency between adjacent frequencies of resonance and frequencies of resonance occur at odd multiples of 90 electrical degrees, the transmission line length at the resonant frequency above carrier frequency, which was found to be the one closest to carrier frequency is 270 electrical degrees in length. The electrical length at the carrier frequency was calculated by the ratio of the carrier frequency to the resonant frequency multiplied by 270 degrees.

TWR	Sample Line Open-Circuit Resonance Below 1250 kHz (kHz)	Sample Line Open-Circuit Resonance Above 1250 kHz (kHz)	Sample Line Calculated Electrical Length At 1250 kHz (Degrees)
1	581.92	1756.64	192.13
2	581.60	1755.36	192.27
3	581.60	1756.00	192.20
4	581.92	1756.32	192.16

The spread between the shortest and longest line is less than 0.2 degrees. Thus, the sample system transmission lines comply with the requirement of the Rules which states the lines must be of equal electrical length within one electrical degree.

To determine the characteristic impedance of the sample lines, open circuit measurements were made at frequencies offset to produce +/-45 degrees of electrical length from resonance. The measured impedance at those frequencies was recorded in the table below and the characteristic impedance was calculated using the following formula where R1+jX1 and R2+jX2 are the measured impedances at the +45 and -45 degree offset frequencies respectfully:

$$Z_0 = \sqrt{\sqrt{R_1^2 + jX_1^2}\sqrt{R_2^2 + jX_2^2}}$$

SAMPLE LINE IMPEDANCE CALCULATIONS

TWR	+45 Deg. Offset Frequency (kHz)	+45 Deg. Measured Impedance (Ohms)	-45 Deg. Offset Frequency (kHz)	+45 Deg. Measured Impedance (Ohms)	Calculated Characteristic Impedance (Ohms)
1	1463.84	2.99 -j49.87	871.52	3.23 + j49.25	49.66
2	1463.84	2.98 - j49.76	871.52	3.23 + j49.34	49.65
3	1463.84	2.98 - j49.76	871.52	3.23 + j49.34	49.65
4	1463.84	2.98 -j49.81	871.52	3.24 + j49.30	49.65

The measured characteristic impedance of the sample lines meets the requirement that the lines be of equal impedance within +/- 2 ohms.

The calibration of the Phasetek P600-202 toroidal current transformers was verified by removing them from the antenna couplers and installing them in a test jig adjacent to each other. A common electrostatically shielded transmission line was run through the center of the test pair and was fed from a radio frequency amplifier driven by a Hewlett Packard model 8753C network analyzer. The Phasetek current transformers do not carry a serial number. For calibration purposes, each transformer was marked with its associated tower number. The P600-203 outputs were fed to the A and B inputs of the analyzer through a pair of equal length 50 ohm double shielded coaxial lines. Serial Number T-2, assigned to Tower-2, was used as the reference for the tests. The "unknown" line was then moved to successive units and the phase and ratio indications for each unit were recorded.

Following the tests with the network analyzer, the tests were repeated with a single pair of transformers, T-2 and T-1, with the reference fed into the daytime reference tower (Tower-2) and the "unknown" fed alternately to the other inputs. The monitor indications were exact for each input port with a ratio indication of 1.002 and a phase indication of 0.0 degrees.

The calibration table appears below.

TWR	Serial No.	Ratio	Phase (Deg)
1	T-1	1.002	-0.1
2	T-2	1.000	0.0
3	T-3	1.003	-0.2
4	T-4	1.001	-0.2

The specified accuracy of the p600-202 is +/- 1.0 percent for magnitude and +/- 2.0 degrees for phase. The requirement that the sample current transformers are accurate within the manufacturer's rated specification is verified.

The impedance at the input of each of the sample lines was measured with the sample current transformers connected. The sample line connection to the antenna monitor was removed and connected to the PA-120 Vector Impedance Analyzer for the measurements. The impedances are tabulated below at the carrier frequency of 1250 kilohertz:

MEASURED INPUT IMPEDANCE OF SAMPLE LINES AT 1250 KHZ

TWR	R (Ohms)	X (Ohms)
1	50.99	+j0.66
2	50.89	+j0.70
3	51.08	+j0.79
4	51.12	+j0.58

4) Direct Measurement of Power

The Common Point Impedance of the daytime directional array was measured at the test jack between the Delta Electronics Common Point Impedance Bridge and the mode switching contactors. The Common Point Ammeter is located immediately ahead of the Common Point Bridge. The impedance was measured with the PA-120 Vector Impedance Analyzer over a band of frequencies from 1230 through 1280 kilohertz. The impedance at the carrier frequency was adjusted to 50-j5.0 ohms which agrees with the indication of the Delta Bridge. This was done to satisfy the requirements of the output network in the Harris 3DX25 transmitter

5) REFERENCE FIELD STRENGTH MEASUREMENTS

DAYTIME MEASUREMENTS

RADIAL 41.0 DEGREES

Point No.	Dist. kM	Latitude NAD-83	Longitude NAD-83	Date	Time	Field mV/m
1	5.51	29° 19′ 16.4″	98° 26′ 12.4″	8/31/2010	1234	5.6
2	7.17	29° 16′ 57.0″	98° 25′ 32.1″	8/31/2010	1250	2.8
3	7.87	29° 20′ 14.3″	98° 25′ 16.2″	8/31/2010	1255	1.9

RADIAL 72.0 DEGREES

Point No.	Dist. kM	Latitude NAD-83	Longitude NAD-83	Date	Time	Field mV/m
1	0.71	29° 28′ 01.3″	98° 28′ 01.3″	8/25/2010	1736	130
2	4.15	29° 17′ 42.8″	98° 25′ 58.9″	8/26/2010	1050	29.5
3	5.32	29° 17′ 55.2″	98° 25′ 18.6″	8/26/2010	1109	17.0
4	6.07	29° 18′ 02.7″	98° 24′ 52.0″	8/26/2010	1114	8.6

REFERENCE FIELD STRENGTH MEASUREMENTS, CONTINUED

DAYTIME MEASUREMENTS

RADIAL 136.5 DEGREES

Point No.	Dist. kM	Latitude NAD-83	Longitude NAD-83	Date	Time	Field mV/m
1	1.6	29° 16′ 24.2″	98° 27′ 45.1″	2/25/2010	1740	115
2	4.23	29° 15′ 22.4″	98° 26′ 37.9″	8/25/2010	1757	36
3	4.61	29° 15′ 13.3″	98° 26′ 28.7″	8/25/2010	1804	31
4	5.26	29° 14′ 58.6″	98° 26′ 11.0″	8/25/2010	1811	24

RADIAL 214.0 DEGREES

Point No.	Dist. kM	Latitude NAD-83	Longitude NAD-83	Date	Time	Field mV/m
1	2.8	29° 15′ 46.7″	98° 29′ 24.4″	8/25/2010	1315	94
2	3.14	29° 15′ 36.5″	98° 29′ 31.1″	8/25/2010	1326	25
3	8.0	29° 13′ 27.3″	98° 31′ 12.1″	8/25/2010	1401	18
4	9.23	29° 12′ 54.0″	98° 31′ 37.2″	0825/2010	1352	12

RADIAL 252.0 DEGREES

Point No.	Dist. kM	Latitude NAD-83	Longitude NAD-83	Date	Time	Field mV/m
1	2.19	29° 16′ 36.8″	98° 29′ 54.1″	8/25/2010	1522	70
2	6.48	29° 16′ 02.1″	98° 32′ 15.7″	8/25/2010	1506	14
3	7.84	29° 15′ 43.9″	98° 33′ 03.0″	8/25/2010	1441	10
4	11.21	29° 15′ 09.1″	98° 35′ 01.7″	8/25/2010	1429	4.5

RADIAL 320.0 DEGREES

Point No.	Dist. kM	Latitude NAD-83	Longitude NAD-83	Date	Time	Field mV/m
1	4.38	29° 18′ 53.9″	98° 30′ 10.7″	8/26/2010	1250	480
2	5.72	29° 19′ 23.0″	98° 30′ 43.4″	8/26/2010	1300	460
3	6.76	29° 19′ 49.6″	98° 31′ 07.4″	8/26/2010	1306	410
4	7.96	29° 20′ 20.3″	98° 31′ 37.1″	8/26/2010	1314	380

Field intensity measurements on the 41.0 degree radial were made by Jeffry S. Caudell, Chief Engineer of Radio Station KZDC. The remainder of the measurements was made by Bertram Goldman of Independence Broadcast Services, Contract Engineer for Radio Station KZDC on the dates and time specified. Mr. Goldman has many years of AM and FM broadcast engineering experience. He

maintains a Broadcast Contracting Business in Dallas, Texas serving radio broadcasting stations.

All measurements used the KZDC Potomac Instruments model FIM-41 field strength meter, serial number 1865 owned by the licensee. The instrument was last calibrated on March 18, 2010 by the manufacturer.

6) TOWER DATA, SECTION III, PARAGRPH 9

TOWER NUMBER (LOCATION)	OVERALL HEIGHT ABOVE BASE INSULATOR (METERS)	OVERALL HEIGHT ABOVE GROUND W/O LIGHTING (METERS)	OVERALL HEIGHT ABOVE GROUND (METERS)
1 (NW)	181	185.9	185.9
2 (NE)	195	200.8	200.8
3 (SE)	195	200.7	200.7
4 (SW)	181	186.6	186.6

7) TOWER LOCATION DATA & RESULTS OF POST CONSTRUCTION SURVEY

ANALYSIS OF SURVEY DATA

TWR	Specified Array Geometry		Post Construction Certification			Deviation From Specified Base Location (Degrees)
	Spacing (Degrees)	Azimuth (Degrees)	Spacing (Feet)	Spacing (Degrees)	Azimuth (Degrees)	
1	REF	REF	REF	REF	REF	REF
2	190.0	46.1	414.86	189.82	45.78	1.13
3	208.6	71.2	458.4	208.85	70.92	1.04
4	88.9	133.3	193.93	88.71	132.98	0.17

The as built tower displacements from the specified locations expressed in electrical degrees at 1250 kilohertz were plotted in a computer aided drafting program. The deviations from the specified distance and bearing were measured at the tips of the data vectors and appear in the last column in fractions of one electrical degree.

This deviation corresponds to space phasing differences in the far field radiation pattern of the array. The deviations are well below the +/- 3.0 electrical degree operating phase tolerance specified for antenna monitor parameters by the FCC.

The array center coordinates are corrected to:

N.L.: 29° 17′ 01″

W.L.: 98° 28′ 28″

Based on NAD-27 Datum

based on the site survey.

8) RFR CONSIDERATIONS

The operation of KZDC will not result in the exposure of workers or the general public to levels of radio frequency radiation in excess of the limits specified in 47 CFR 1.1210. The entire site is fenced with a locked gate at the entrance to the property. Wood fences have been installed about each of the tower bases to restrict access beyond those necessary to prevent electric and magnetic field exposure above the required levels.

The fence sizes were determined with reference to Table 2 of Supplement A to FCC OET Bulletin 65 (Edition 97-01). According to Table 2, the predicted "Distance for Compliance with FCC Limits" at 1250 kilohertz, for 50 kilowatts fed into a single tower 0.25 wavelength in height is four meters. For a power of 10 kilowatts, the distance is two meters.

The 25 kilowatts of power in the KZDC system is divided among four towers in the daytime array with no single tower exceeding twelve thousand watts. Each of the fence surfaces has a minimum distance from the tower or the RF feeder pipe of fourteen feet, 6 inches (4.42 meters), well in excess of the required distance for 12 thousand watts.

Signs are posted at the main entrance to the property warning of potentially hazardous RF energy within the fenced areas.

The wood fences limit access to areas with fields which exceed the requirements of the Rules for the directional antenna system. If it is necessary for workers to enter the fenced areas for an extended period of time, the station may switch to non-directional operation with tower 1 to deactivate the other three towers. Should access be required within the tower 1 fenced area for a significant period of time, operation will be temporarily suspended. The KZDC facility is, therefore, in full compliance with regard to radio frequency radiation exposure.

9) Certified Post Construction Survey

The Post Construction Survey was prepared by Clinton L. Rippy, a Registered Land Surveyor in the State of Texas. Mr. Rippy performed a detailed as built survey for the KZDC transmitter plant.
The survey appears on the next page.

RADIO STATION KZDC
1250 KHZ, 25 KW, DA-D
SAN ANTONIO, TEXAS

Station Owner: Bmp San Antonio License Company, I.P.

"THE RIPPY SURVEYING CO., INC."
10600 KIT CARSON DR.
AUSTIN, TEXAS 78737
PH 288-8976 FAX 288-2001

THE STATE OF TEXAS:
COUNTY OF HAYS:

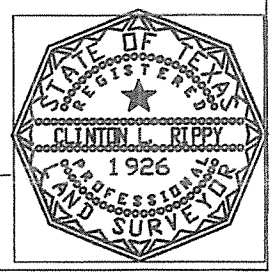
TO THE OWNERS OF THE PREMISES SURVEYED:
The undersigned does hereby certify that this survey was this day made on the ground of the property legally described hereon and is correct, and that there are no discrepancies, conflicts, shortages in area, boundary line conflicts, encroachments, overlapping of improvements, visible utility lines or roads in place, except as shown hereon.

USE OF THIS SURVEY FOR ANY OTHER PURPOSE OR OTHER PARTIES SHALL BE AT THEIR RISK AND UNDERSIGNED IS NOT RESPONSIBLE TO OTHERS FOR ANY LOSS RESULTING THEREFROM.

Job No. 92823 Dated this the 25th day of May, 2010

Clinton L Rippy

CLINTON L. RIPPY
REGISTERED PROFESSIONAL
LAND SURVEYOR
NUMBER 1926



SELLMEYER ENGINEERING
BROADCAST & COMMUNICATION CONSULTING ENGINEERS
2 Pecan Grove Circle, Lucas, Texas 75002
MEMBER AFCCE

CERTIFICATION OF ENGINEER

I hereby state that:

I am President of Sellmeyer Engineering

The Firm of Sellmeyer Engineering has been retained by BMP San Antonio License Company, L.P. to prepare this Engineering Exhibit

I am a graduate of Arizona State University with the degree of Bachelor of Science in Engineering

I am a Registered Professional Engineer in the States of Ohio and Texas

My qualifications as an Engineer are a matter of record with the Federal Communications Commission

This Engineering Exhibit was prepared by me personally or under my direct supervision, and

All facts stated herein are true and correct to the best of my knowledge and belief.

J. S. Sellmeyer P. E.

August 31, 2010

Sellmeyer Engineering
2 Pecan Grove Circle
Lucas, Texas 75002
972-542-2056
jack@sellmeyereng.com
Texas Firm Number: F-004814